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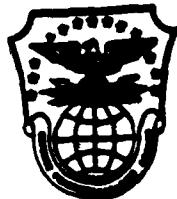
DEFENSE COMMUNICATIONS AGENCY

UPPER LEVEL PROTOCOL TEST SYSTEM

TELNET PROTOCOL MIL-STD 1782
TEST TRACEABILITY INDEX

MAY 1988

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Comments

Comments or questions about this software product and documentation can
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                                1860 Wiehle Ave
                                Reston, VA 22090-5500
                                ATTN: Protocol Test System Administrator

TELNET PROTOCOL (TELNET)

MIL-STD-1782

TRACEABILITY MATRIX

This Traceability Matrix provides information on the derivation, organization, and function of tests specified for TELNET within the protocol test system.

This document is divided into five sections:

TELNET TRACEABILITY INDEX;
USER TELNET TESTS INDEX;
SERVER TELNET TESTS INDEX;
TELNET TEST SCENARIOS INDEX;
TELNET SCENARIOS AND TESTS DESCRIPTIONS.

TELNET TRACEABILITY INDEX: TELNET TEST NUMBERS VERSUS TELNET MIL-STD-1782 REFERENCES . . .

The table indicates the cross-reference between the Test Scenarios and the applicable section in MIL-STD-1782 regarding each required function, operation, option, mode, response, or state.

NOTE...

Although the Test Numbers in the USER scenarios replicate the Test Numbers in the SERVER scenarios a common Test Number does not indicate equivalent, complementary, or corresponding tests;

USER TELNET TESTS INDEX: TELNET TEST NUMBERS versus USER TELNET Commands/Primitives/Options/Modes . . .

The table shows the TELNET Test Numbers which may be regarded as the "principal tests" of each USER TELNET Command or Primitive and/or Option or Mode.

SERVER TELNET TESTS INDEX: TELNET TEST NUMBERS versus SERVER TELNET Response Codes . . .

The table shows the TELNET Test Numbers which may be regarded as the "principal tests" of each SERVER TELNET Response (or State, etc.) to the indicated TELNET Commands or Primitives.

TELNET TEST SCENARIOS INDEX: TELNET TEST SCENARIO FILES versus TELNET TEST NUMBERS . . .

The table shows, for each TELNET Test Number, the UNIX filenames of the TELNET Test Scenario Files in which it appears.

TELNET SCENARIOS AND TESTS DESCRIPTIONS . . .

This section provides a brief narrative of the scope and objectives of each TELNET test Scenario File and a narrative or graphic operational description of each TELNET Test Number.

===

SECTION 1 - TELNET TRACEABILITY INDEX

The following table shows, for MIL-STD-1782, the TELNET Test Numbers which may be regarded as the "principal tests" of each required function, operation, option, mode, response, or state.

Test Numbers not indicated here may be used to establish necessary predecessor conditions for these tests.

Although the Test Numbers in the USER scenarios replicate the Test Numbers in the SERVER scenarios a common Test Number does not indicate equivalent, complementary, or corresponding tests.

MIL-STD-1782 Reference	User Tests
4.2.2	1, 2, 3, 4, 5, 6
4.2.3	1, 2, 3, 4, 5, 6
4.2.4	18, 20
4.3	22, 14
4.3.1.2	22
4.3.2	19
4.4.1	17
4.4.2	11
4.4.3	8
4.4.4	9
4.4.5	10
4.5	7
4.6.1.1	15, 16
4.6.1.3.2	13
4.7.1.b	12
4.8	22
APPENDIX A	3
APPENDIX B	1
APPENDIX C	2

APPENDIX D   6
APPENDIX E   4
APPENDIX F   5

MIL-STD-1782 Reference	**Server Tests**
4.2.2	1, 2, 3, 4, 5, 6
4.2.3	1, 2, 3, 4, 5, 6
4.3	19, 11
4.3.1.2	19
4.4.2	7
4.5	7
4.5.1	15
4.6.1.1	11, 12
4.6.1.3.3	17
4.6.1.3.4	16
4.6.1.3.5	8
4.6.1.3.6	9
4.6.1.3.7	10
4.7.1.b	14
4.8	19
APPENDIX A	3
APPENDIX B	1
APPENDIX C	2
APPENDIX D	6
APPENDIX E	4
APPENDIX F	5

SECTION 2 - USER TELNET TESTS INDEX

USER TEST NUMBERS versus USER TELNET Commands or Primitives

The following table shows the TELNET Test Numbers which may be regarded as the "principal tests" of each USER TELNET Command or Primitive and/or Option or Mode.

Test Numbers not indicated here may be used to establish necessary predecessor conditions for these tests.

Although the Test Numbers in the USER scenarios replicate the Test Numbers in the SERVER scenarios a common Test Number does not indicate equivalent, complementary, or corresponding tests.

Command or Primitive	Option	User Test Number
Open connection		22
Network Virtual Terminal	Go Ahead status	22
Network Virtual Terminal	Echo status	22
Response to DO option request		
	Remote echo	1
	GoAhead	2
	Binary	3
	Timing Mark	4
	Extended Options	5
	Status	6
Response to DO option request for enabled option		
	Remote echo	1
	GoAhead	2
	Binary	3
	Timing Mark	4
	Extended Options	5
	Status	6
Response to DON'T option request for disabled option		
	Remote echo	1
	GoAhead	2
	Binary	3
	Timing Mark	4
	Extended Options	5
	Status	6
Response to WILL option request for enabled option		
	Remote echo	1
	GoAhead	2
	Binary	3
	Timing Mark	4
	Extended Options	5
	Status	6

Response to WONT option--announcement of disabling

```
                              Remote echo        1
                              GoAhead            2
                              Binary             3
                              Timing Mark        4
                              Extended Options   5
                              Status             6

Response to request to enable option peer has enabled
                              Remote echo        1
                              GoAhead            2
                              Binary             3
                              Timing Mark        4
                              Extended Options   5
                              Status             6

Correct implementation of enabled option
                              Remote echo        1
                              GoAhead            2
                              Binary             3
                              Status             6

Correct implementation after disabling option
                              Remote echo        1
                              GoAhead            2
                              Binary             3
                              Status             6

Correct implementation of option when both sides enabled
                              GoAhead            2
                              Binary             3
                              Status             6
```

```
Generation of synch embedding Data Mark (DM)  7
Generation of Are You There command (AYT)      8
Generation of Erase Character command (EC)     9
Generation of Erase Line command (EL)         10
Generation of Abort Output command (AO)       11
Generation of No Operation (NOP)              12
Generation of Break command (BRK)             13
Transmission of ASCII printable characters    14
Transmission and receipt of Newline (CRLF)    15
Transmission and receipt of Carriage Return (CR NULL) 16
Generation of Interrupt Process command (IP) 17
Non-transmission of request for previously refused option
                              Binary            18
Generation of GoAhead command (GA)            19
Non-transmission of subnegotiation for disabled option
                              Status            20
Close connection                              21
```

SECTION 3 - SERVER TELNET TESTS INDEX

TELNET TEST NUMBERS versus SERVER TELNET Responses

The following table shows the TELNET Test Numbers which may be regarded as the "principal tests" of each SERVER TELNET Response (or State, etc.) to the indicated SERVER TELNET Commands or Primitives.

Test Numbers not indicated here may be used to establish necessary predecessor conditions for these tests.

Although the Test Numbers in the USER scenarios replicate the Test Numbers in the SERVER scenarios a common Test Number does not indicate equivalent, complementary, or corresponding tests.

Command or Primitive	Option	Server Test Number
Open connection		19
Network Virtual Terminal	go ahead status	19
Network Virtual Terminal	echo status	19
Response to DO option request		
	Remote echo	1
	GoAhead	2
	Binary	3
	Timing Mark	4
	Extended Options	5
	Status	6
Response to DO option request for enabled option		
	Remote echo	1
	GoAhead	2
	Binary	3
	Timing Mark	4
	Extended Options	5
	Status	6
Response to DON'T option request for disabled option		
	Remote echo	1
	GoAhead	2
	Binary	3
	Timing Mark	4
	Extended Options	5
	Status	6
Response to WILL option request for enabled option		
	Remote echo	1
	GoAhead	2
	Binary	3
	Timing Mark	4
	Extended Options	5
	Status	6

Response to WONT option--announcement of disabling

Remote echo	1
GoAhead	2
Binary	3
Timing Mark	4
Extended Options	5
Status	6

Response to request to enable option peer has enabled

Remote echo	1
GoAhead	2
Binary	3
Timing Mark	4
Extended Options	5
Status	6

Correct implementation of enabled option

Remote echo	1
GoAhead	2
Binary	3
Status	6

Correct implementation after disabling option

Remote echo	1
GoAhead	2
Binary	3
Status	6

Correct implementation of option when both sides enabled

GoAhead	2
Binary	3
Status	6

Response to synch	7
Response to Are You There (AYT)	8
Response to Erase Character (EC)	9
Response to Erase Line (EL)	10
Receipt of ASCII printable characters	11
Transmission and receipt of newline (CRLF)	12
Transmission and receipt of carriage return (CR NULL)	13
Response to No Operation (NOP)	14
Response to Data Mark (DM) with no TCP Urgent	15
Response to Abort Output (AO)	16
Response to Interrupt Process (IP)	17
Close connection	18

SECTION 4 - TELNET TEST SCENARIOS INDEX

TELNET TEST SCENARIO FILES versus TELNET TEST NUMBERS

The following table shows, for each TELNET Test Number, the UNIX
filenames of the TELNET test Scenario Files in which it may be
regarded as a "principal test" objectives.

A Test Number may be used, to establish necessary predecessor
conditions for other Test Numbers, in Scenario Files not
indicated here.

Although the Test Numbers in the USER scenarios replicate the
Test Numbers in the SERVER scenarios a common Test Number does
not indicate equivalent, complementary, or corresponding tests.

USER TELNET

Test Number	User Scenario File
22	USER_BASIC
1	
2	
3	
4	
5	
6	
14	
15	
16	
18	
20	
21	
8	USER_OPTIONS1
9	
10	
17	
19	
11	USER_OPTIONS2
13	
7	USER_SYNCH

SERVER TELNET

Test Number	Server Scenario File
19	SERVER_BASIC
1	
2	
3	
4	
5	
6	
11	
12	
13	
14	
15	
18	
8	SERVER_OPTIONS1
9	
10	
17	
16	SERVER_OPTIONS2
7	SERVER_SYNCH

SECTION 5 – TELNET SCENARIOS AND TESTS DESCRIPTIONS

USER TELNET

This section summarizes the scope and objectives of each User
TELNET test scenario and describes the operational
characteristics of each test within each scenario.

===

Scenario USER BASIC

Scenario **USER_BASIC** Tests Network Virtual Terminal (NVT)
characteristics of TELNET implementation.

Test 22: **Open, Initial NVT GoAHead and Echo Status**

    a. Open

      – Can a connection be opened?

      ACTION: IUT directed to send an open command.

      VERIFICATION: Check that message "SERVER TELNET"
          received from REF server implementation.

      SUCCESS: Connection opened.

      FAILURE: Connection not opened.

    b. NVT GoAhead status

      – Is the user TELNET waiting for the GoAhead before
          sending data?

    ACTION: Send a data string from the IUT to the the REF
        peer.

    VERIFICATION: Check that data not received by REF
          peer until the REF has sent a GoAhead.

    SUCCESS: Data sent within 60 seconds of receiving a
        GoAhead.

    FAILURE: Data sent without waiting for GoAhead or
        not sent within 60 seconds of receiving GoAhead.

    c. NVT echo status

      – Is the user not remotely echoing?

ACTION: Send a data string REF to the IUT.

VERIFICATION: Check that the data string the REF
        has issued is not returned back over the network
        connection to the REF.

SUCCESS: Data string not received back by REF,
        therefore IUT not remotely echoing.

FAILURE: Data string received back by REF - IUT
        remotely echoing.

Test 12: **NoOperation (NOP) Command**

- Can the user TELNET generate a NOP?

ACTION: IUT sends a NOP command.

VERIFICATION: Check that REF reports that it has
        received the NOP command.

SUCCESS: NOP command received by REF.

FAILURE: NOP command not received by REF.

Test 14: **Correct Generation of ASCII Printable Character Set**

- Can the user TELNET correctly generate the ASCII
        printable character set?

ACTION: The IUT sends a string containing all the
        ASCII printable characters to the REF.

VERIFICATION: Check that the REF receives the
        character string sent by the IUT with all
        characters correctly transmitted.

SUCCESS: REF receives a correctly transmitted character
        string of all the ASCII printable characters.

FAILURE: REF does not correctly receive a character
        string of all ASCII printable characters.

Test 15: **Transmission and Reception of Newline Character**

- Does the IUT correctly send and receive the Carriage
        Return Line-Feed <CR LF> combination?

ACTION: The IUT sends a data string with newline
        characters embedded. The REF sends a data string
        with newline characters embedded to the IUT.

VERIFICATION: Check that the REF receives the data
string with the newlines in the correct places.
Check that the IUT receives the data string with
the newlines in the correct places.

SUCCESS: The IUT user TELNET correctly sends the
<CR LF> combination for newline and correctly
interprets <CR LF> as newline when it is
received.

FAILURE: The IUT does not correctly send and/or
interpret the newline character.

Test 16: **Transmission and Reception of Carriage Return**

- Does the IUT correctly transmit a Carriage Return as
<CR NULL> and interpret <CR NULL> as Carriage
Return when it is received?

ACTION: IUT sends a data string with a carriage
return embedded in it. The REF sends a data
string with a carriage return embedded in it.

VERIFICATION: Check that the REF reports that it has
received a <CR NULL> from the IUT. Check that the
IUT has received a data string from the REF
containing a carriage return.

SUCCESS: The IUT correctly transmits a <CR NULL> for a
carriage return and can correctly interpret a
<CR NULL> as a carriage return.

FAILURE: The IUT does not correctly transmit <CR NULL>
for carriage return and/or interpret <CR NULL> as
carriage return.

Test 1: **Negotiation and Implementation of Remote Echo Option**

- Does the IUT user TELNET correctly respond to
negotiation requests and denials?
Does the IUT correctly enable.the remote echo option
it has agreed to enable?
Does the IUT correctly disable the remote echo option
when negotiated?

ACTION: REF initiates negotiation sequence and takes
the IUT through the states of responding to the
request to do the the option, responding to a
request for an option when it is already enabled,
responding to a request to disable the option,
responding to a peer's announcement that it

wishes to do an option, and the peer's refusal to do the option.
If the IUT agrees to enable the remote echo, the REF sends a data string to the IUT to determine if the string is remotely echoed back. When the option is disabled, the REF sends a data string to the IUT to determine whe·her the IUT is still remotely echoing.

VERIFICATION: Check the option replies reported as received by the REF for correctness. If testing correct implementation of the remote echo, check if the REF has received back the transmitted data string.

SUCCESS: The IUT correctly responds to the negotiation sequences. The IUT correctly enables and disables the remote echo. The data string is received by the REF when the IUT is in remote echo mode; it is not received when the option is disabled.

FAILURE: The IUT does not correctly respond to the negotiation sequences and/or the IUT does not correctly enable and disable the Remote Echo option.

Test 2:   Negotiation and Implementation of Suppress GoAhead

- Does the IUT user TELNET correctly respond to negotiation requests and denials?
  Does the IUT correctly enable the GoAhead option it has agreed to enable?
  Does the IUT correctly disable the GoAhead option when negotiated?

ACTION: REF initiates negotiation sequence and takes the IUT through the states of responding to a request to do the option, responding to a request for the option when it is already enabled, responding to a command to disable the option, responding to its peer's announcement that is wishes to enable the option, and responding to the peer's command to disable the option.
If the IUT agrees to enable the Suppress GoAhead option, the IUT sends a data string to the REF; no GoAheads are being generated by the server REF. When the option is disabled, the REF is inhibited from sending GoAheads and the IUT attempts to send a data string to the REF.

VERIFICATION: Check the IUT option replies reported by the REF for correctness. If testing correct implementation of the Suppress GoAhead, check if

the REF has received the transmitted data string although no GoAheads are being generated. If the option is disabled, check if the IUT waited for the GoAhead to send data and if the data string was sent within 60 seconds of receiving the GoAhead.

SUCCESS: The IUT correctly responds to the negotiation sequences. The IUT correctly enables and disables the Suppress GoAhead option.

FAILURE: The IUT does not correctly respond to the negotiation sequences and/or the IUT does not correctly enable and disable the Suppress GoAhead option.

Test 3: Negotiation and Implementation of Binary Option

- Does the IUT user TELNET correctly respond to negotiation requests and denials?
  Does the IUT correctly enable the Binary option it has agreed to enable?
  Does the IUT correctly disable the Binary option when negotiated?

ACTION: REF initiates negotiation sequence and takes the IUT through the states of responding to a request to do the option, responding to a request for the option when it is already enabled, responding to a command to disable the option, responding to its peer's announcement that is wishes to enable the option, and responding to the peer's command to disable the option. If the IUT agrees to enable the Binary option, the IUT sends a data string of non-printable ASCII characters , including one TELNET IAC(377), to the REF; When the option is disabled, the IUT sends the same data string to the IUT. When the IUT has agreed that the REF can transmit in binary, a data string containing ASCII unprintable characters is sent from the REF to the IUT.

VERIFICATION: Check the IUT option replies reported by the REF for correctness. When testing implementation of the enabled Binary option, check if the REF has reported receiving two IACs from the IUT. When the option has been disabled, check the REF to determine that two IACs have not been transmitted. When the IUT has agreed that the REF may transmit Binary, check that the transmitted data string was correctly interpreted by the IUT.

SUCCESS: The IUT correctly responds to the negotiation sequences. The IUT correctly enables and disables the Binary option.

FAILURE: The IUT does not correctly respond to the negotiation sequences and/or the IUT does not correctly enable and disable the Binary option.

Test 4: Negotiation of Timing Mark Option

- Does the IUT user TELNET correctly respond to negotiation requests and denials?

ACTION: REF initiates negotiation sequence and takes the IUT through the states of responding to a request to do the option, responding to a request for the option when it is already enabled, responding to a command to disable the option, responding to its peer's announcement that is wishes to enable the option, and responding to the peer's command to disable the option.

VERIFICATION: Check the IUT option replies reported by the REF for correctness.

SUCCESS: The IUT correctly responds to the negotiation sequences.

FAILURE: The IUT does not correctly respond to the negotiation sequences.

Test 5: Negotiation of Extend Option List Option

- Does the IUT user TELNET correctly respond to negotiation requests and denials?

ACTION: REF initiates negotiation sequence and takes the IUT through the states of responding to a request to do the option, responding to a request for the option when it is already enabled, responding to command to disable the option, responding to its peer's announcement that it wishes to enable the option, and responding to the peer's command to disable the option.

VERIFICATION: Check the IUT option replies reported by the REF for correctness.

SUCCESS: The IUT correctly responds to the negotiation sequences.

FAILURE: The IUT does *not* correctly respond to the negotiation sequences.

Test 6: Negotiation and Implementation of Status Option

- Does the IUT user TELNET correctly respond to negotiation requests and denials?
  Does the IUT correctly enable the Status option it has agreed to enable?
  Does the IUT correctly disable the Status option when negotiated?

ACTION: REF initiates negotiation sequence and takes the IUT through the states of responding to a request to do the option, responding to a request for the option when it is already enabled, responding to a command to disable the option, responding to its peer's announcement that is wishes to enable the option, and responding to the peer's command to disable the option.
If the IUT agrees to enable the Status option, the REF sends the subnegotiation command Status Send to the IUT.

VERIFICATION: Check the IUT option replies reported by the REF for correctness. When testing implementation of the enabled Status option, check if the REF has reported receiving a Status Is subnegotiation reply from the IUT correctly listing the status of the negotiated options.

SUCCESS: The IUT correctly responds to the negotiation sequences. The IUT correctly enables the Status option.

FAILURE: The IUT does not correctly respond to the negotiation sequences and/or the IUT does not correctly enable the Status option.

Test 18: Non-transmission of Request for a Refused Option Until a New Connection has been Made or the Status of Another Option Changed.

- Does the IUT user TELNET correctly not send a request for a previously refused option?

ACTION: REF is placed in a state where it refuses all options. The IUT requests the REF to Do Binary and is refused. The IUT is directed to again request the option.

VERIFICATION: Check to see if the REF reports
having received the second option request.

SUCCESS: The IUT correctly did not send the second
option request to the REF.

FAILURE: *The IUT sends the second option request to
the REF.*

Test 20: **Subnegotiation Command not Sent for an Unnegotiated
Option**

- Does the IUT user TELNET correctly not send a
subnegotiation request for an unnegotiated
option?

ACTION: Status option is not enabled. IUT is
directed to send the subnegotiation command
Status Send to the REF.

VERIFICATION: Check to see if the REF reports
having received the subnegotiation request.

SUCCESS: The IUT correctly did not send the
subnegotiation request to the REF.

FAILURE: The IUT sends the subnegotiation request to
the REF

Test 21: **Close the TELNET Connection (Not an explicit part of
MIL-STD-1782)**

- Can the IUT user TELNET close the Telnet connection?

ACTION: The IUT is directed to close the connection.

VERIFICATION: Check to see if the REF reports
having received the Close.

SUCCESS: The IUT correctly closes the Telnet
connection.

FAILURE: *The REF never receives a Close from the IUT.*

===

Scenario USER OPTIONS1

Scenario **USER_OPTIONS1** tests commonly implemented optional
TELNET commands: Are You There; Erase Character; Erase Line; Go
Ahead; and Interrupt Process.

Test 8:   **Are You There (AYT) Command**

- Can the user TELNET generate an AYT?

ACTION: IUT sends an AYT command.

VERIFICATION: Check that REF reports that it has
received the AYT command.

SUCCESS: AYT command received by REF.

FAILURE: AYT command not received by REF.

Test 9:   **Erase Character (EC) Command**

- Can the user TELNET generate an EC?

ACTION: IUT sends an EC command.

VERIFICATION: Check that REF reports that it has
received the EC command.

SUCCESS: EC command received by REF.

FAILURE: EC command not received by REF.

Test 10:   **Erase Line (EL) Command**

- Can the user TELNET generate an EL?

ACTION: IUT sends an EL command.

VERIFICATION: Check that REF reports that it has
received the EL command.

SUCCESS: EL command received by REF.

FAILURE: EL command not received by REF.

Test 19: **GoAhead (GA) Command**

- Can the user TELNET generate a GA?

ACTION: IUT sends a GA command.

VERIFICATION: Check that REF reports that it has
received the GA command.

SUCCESS: GA command received by REF.

FAILURE: GA command not received by REF.

Test 20: **Interrupt Process (IP) Command**

- Can the user TELNET generate an IP?

ACTION: IUT sends an IP command.

VERIFICATION: Check that REF reports that it has
received the IP command.

SUCCESS: IP command received by REF.

FAILURE: IP command not received by REF.

===

Scenario USER OPTIONS2

Scenario **USER_OPTIONS2** tests less commonly implemented
optional TELNET commands: Break and Abort Output.

Test 13: **Break (BRK) Command**

- Can the user TELNET generate a BRK?

ACTION: IUT sends a BRK command.

VERIFICATION: Check that REF reports that it has
received the BRK command.

SUCCESS: BRK command received by REF.

FAILURE: BRK command not received by REF.

Test 11: **Abort Output (AO) command**

> - Can the user TELNET generate an AO?
>
> ACTION: IUT sends an AO command.
>
> VERIFICATION: Check that REF reports that it has
>   received the AO command
>
> SUCCESS: AO command received by REF.
>
> FAILURE: AO command not received by REF.

===

Scenario USER SYNCH

Scenario **USER_SYNCH** tests the less commonly implemented optional
TELNET command: Synch.

Test 7: **Synch Command (TCP urgent with Data Mark (DM) embedded
in the data stream).**

> - Can the user TELNET generate a Synch?
>
> ACTION: IUT sends a Synch command embedded in a data
>   string.
>
> VERIFICATION: Check that REF reports that it has
>   received the TCP Urgent and the DM. Check that
>   the DM is placed in the proper position in the
>   data stream.
>
> SUCCESS: The TCP Urgent and the correctly placed DM
>   received by REF.
>
> FAILURE: The TCP Urgent and/or the correctly placed DM
>   not received by REF.

==

SERVER TELNET

This section summarizes the scope and objectives of each Server
TELNET test scenario and describes the operational
characteristics of each test within each scenario.

==

Scenario SERVER BASIC

Scenario **SERVER_BASIC** Tests Network Virtual Terminal (NVT)
characteristics of TELNET implementation.

Test 19: **Open, Initial NVT GoAhead and Echo Status**

a. Open
   - Can a connection be opened?

   ACTION: REF sends an open command.

   VERIFICATION: Check that the message "login" is
        received from REF user implementation.

   SUCCESS: Connection opened.

   FAILURE: Connection not opened.

b. NVT GoAhead status
   - Is the server TELNET generating the GoAhead?

   ACTION: Opening the connection should result in
        the server Telnet sending a GoAhead to user
        Telnet.

   VERIFICATION: Check that the REF reports having
        received a GoAhead.

   SUCCESS: A GoAhead generated by the IUT.

   FAILURE: IUT not generating GoAhead.

c. NVT echo status
   - Is the IUT server remotely echoing?

   ACTION: Send a data string from the REF to the IUT.

   VERIFICATION: Check that the data string the REF
        has issued is not returned back over the network
        connection to the REF.

SUCCESS: Data string not received back by REF
therefore IUT not remotely echoing.

FAILURE: Data string received back by REF - IUT
remotely echoing.

Test 11:   **Correct Interpretation of ASCII Printable Character Set**

- Can the server TELNET correctly interpret the ASCII
printable character set?

ACTION: The REF sends a string containing all the
ASCII printable characters to the IUT.

VERIFICATION: Check that the IUT returns to the
Central Driver the same data string sent by the
REF.

SUCCESS: IUT correctly interprets the character string
of all the ASCII printable characters.

FAILURE: IUT does not correctly interpret a character
string of all ASCII printable characters.

Test 12:   **Transmission of Newline Character**

- Does the IUT correctly send the Carriage-Return
Line-Feed <CR LF> combination?

ACTION: The IUT is directed to send a data string
with newline characters embedded.

VERIFICATION: Check that the REF receives the data
string with the newlines in the correct places
and specified with a <CR><LF>(octal 15 followed
by octal 12).

SUCCESS: The IUT user TELNET correctly sends the
<CR LF> combination for newline.

FAILURE: The IUT does not correctly send newline
character.

Test 13:   **Transmission and Reception of Carriage Return**

- Does the IUT correctly transmit a Carriage Return as
<CR NULL> and interpret <CR NULL> as Carriage
Return when it is received?

ACTION: IUT sends a data string with a carriage

return embedded in it. The REF sends a data
string with a carriage return embedded in it.

VERIFICATION: Check that the REF has received a data
string from the IUT containing a <CR> (octal 15).
Check that the IUT has received a data string
from the REF containing a carriage return.

SUCCESS: The IUT correctly transmits a <CR NULL> for a
carriage return and can correctly interpret a <CR
NULL> as a carriage return.

FAILURE: The IUT does not correctly transmit <CR NULL>
for carriage return and/or interpret <CR NULL> as
carriage return.

Test 14: **NoOperation (NOP) Command**

- Can the server TELNET correctly handle a NOP in the
data stream?

ACTION: REF sends a NOP command embedded in a data
string to the IUT.

VERIFICATION: Check that IUT returns to the Central
Driver the data string with the NOP removed and
having had no effect on the data string.

SUCCESS: NOP command correctly handled by IUT.

FAILURE: NOP command not correctly handled by the IUT.

Test 15: **Data Mark (DM) command with no corresponding TCP**
Urgent.

- Can the server TELNET correctly handle a DM in the
data stream?

ACTION: REF sends a DM command embedded in a data
string to the IUT. No TCP Urgent is sent.

VERIFICATION: Check that IUT returns to the Central
Driver the data string with the DM removed and
having had no effect on the data string.

SUCCESS: Unaccompanied DM command correctly handled by
IUT.

FAILURE: Unaccompanied DM command not correctly handled
by the IUT.

Test 1: **Negotiation and Implementation of Remote Echo Option**

 - Does the IUT server TELNET correctly respond to
   negotiation requests and denials?
  Does the IUT correctly enable the remote echo option
   it has agreed to enable?
  Does the IUT correctly disable the remote echo option
   when negotiated?

 ACTION: REF initiates negotiation sequence and takes
   the IUT through the states of responding to the
   request to do the the option, responding to a
   request for an option when it is already enabled,
   responding to a request to disable the option,
   responding to a peer's announcement that it
   wishes to do an option, and the peer's refusal to
   do the option.
   If the IUT agrees to enable the remote echo, the
   REF sends a data string to the IUT to determine
   if the string is remotely echoed back. When the
   option is disabled, the REF sends a data string
   to the IUT to determine whether the IUT is still
   remotely echoing.

 VERIFICATION: Check the option replies reported as
   received by the REF for correctness. If testing
   correct implementation of the remote echo, check
   if the REF has received back the transmitted data
   string.

 SUCCESS: The IUT correctly responds to the negotiation
   sequences. The IUT correctly enables and disables
   the remote echo. The data string is received by
   the REF when the IUT is in remote echo mode; it
   is not received when the option is disabled.

 FAILURE: The IUT does not correctly respond to the
   negotiation sequences and/or the IUT does not
   correctly enable and disable the Remote Echo
   option.

Test 2: **Negotiation and Implementation of Suppress GoAhead**
Option

 - Does the IUT server TELNET correctly respond to
   negotiation requests and denials?
  Does the IUT correctly enable the GoAhead option it
   has agreed to enable?
  Does the IUT correctly disable the GoAhead option
   when negotiated?

 ACTION: REF initiates negotiation sequence and takes

the IUT through the states of responding to a
request to do the option, responding to a request
for the option when it is already enabled,
responding to a command to disable the option,
responding to its peer's announcement that is
wishes to enable the option, and responding to
the peer's command to disable the option.
If the IUT agrees to enable the Suppress GoAhead
option, the IUT sends a data string to the REF;
no GoAheads are being generated by the server
REF. When the option is disabled, the REF is
inhibited from sending GoAheads and the IUT
attempts to send a data string to the REF.

VERIFICATION: Check the IUT option replies reported
by the REF for correctness. If testing correct
implementation of the Suppress GoAhead, check if
the REF has received the transmitted data string
although no GoAheads are being generated. If the
option is disabled, check if the IUT waited for
the GoAhead to send data and if the data string
was sent within 60 seconds of receiving the
GoAhead.

SUCCESS: The IUT correctly responds to the negotiation
sequences. The IUT correctly enables and disables
the Suppress GoAhead option.

FAILURE: The IUT does not correctly respond to the
negotiation sequences and/or the IUT does not
correctly enable and disable the Suppress GoAhead
option.

Test 3: Negotiation and Implementation of Binary Option

- Does the IUT server TELNET correctly respond to
negotiation requests and denials?
Does the IUT correctly enable the Binary option it
has agreed to enable?
Does the IUT correctly disable the Binary option when
negotiated?

ACTION: REF initiates negotiation sequence and takes
the IUT through the states of responding to a
request to do the option, responding to a request
for the option when it is already enabled,
responding to a command to disable the option,
responding to its peer's announcement that is
wishes to enable the option, and responding to
the peer's command to disable the option.
If the IUT agrees to enable the Binary option,
the IUT sends a data string of non-printable
ASCII characters , including one TELNET IAC(377),

to the REF;
When the option is disabled, the IUT sends the
same data string to the IUT. When the IUT has
agreed that the REF can transmit in binary, a
data string containing ASCII unprintable
characters is sent from the REF to the IUT.

VERIFICATION: Check the IUT option replies reported
by the REF for correctness. When testing
implementation of the enabled Binary option,
check if the REF has reported receiving two IACs
from the IUT.
When the option has been disabled, check the REF
to determine that two IACs have not been
transmitted.
When the IUT has agreed that the REF may transmit
Binary, check that the transmitted data string
was correctly interpreted by the IUT.

SUCCESS: The IUT correctly responds to the negotiation
sequences. The IUT correctly enables and disables
the Binary option.

FAILURE: The IUT does not correctly respond to the
negotiation sequences and/or the IUT does not
correctly enable and disable the Binary option.

Test 4: Negotiation of Timing Mark Option

- Does the IUT server TELNET correctly respond to
negotiation requests and denials?

ACTION: REF initiates negotiation sequence and takes
the IUT through the states of responding to a
request to do the option, responding to a request
for the option when it is already enabled,
responding to a command to disable the option,
responding to its peer's announcement that is
wishes to enable the option, and responding to
the peer's command to disable the option.

VERIFICATION: Check the IUT option replies reported
by the REF for correctness.

SUCCESS: The IUT correctly responds to the negotiation
sequences.

FAILURE: The IUT does not correctly respond to the
negotiation sequences.

Test 5: **Negotiation of Extend Option List Option**

- Does the IUT server TELNET correctly respond to negotiation requests and denials?

ACTION: REF initiates negotiation sequence and takes the IUT through the states of responding to a request to do the option, responding to a request for the option when it is already enabled, responding to a command to disable the option, responding to its peer's announcement that is wishes to enable the option, and responding to the peer's command to disable the option.

VERIFICATION: Check the IUT option replies reported by the REF for correctness.

SUCCESS: The IUT correctly responds to the negotiation sequences.

FAILURE: The IUT does not correctly respond to the negotiation sequences.

Test 6: **Negotiation and Implementation of Status Option**

- Does the IUT server TELNET correctly respond to negotiation requests and denials?
  Does the IUT correctly enable the Status option it has agreed to enable?
  Does the IUT correctly disable the Status option when negotiated?

ACTION: REF initiates negotiation sequence and takes the IUT through the states of responding to a request to do the option, responding to a request for the option when it is already enabled, responding to a command to disable the option, responding to its peer's announcement that is wishes to enable the option, and responding to the peer's command to disable the option. If the IUT agrees to enable the Status option, the REF sends the subnegotiation command Status Send to the IUT.

VERIFICATION: Check the IUT·option replies reported by the REF for correctness. When testing implementation of the enabled STATUS, check if the REF has reported receiving a Status Is subnegotiation reply from the IUT correctly listing the status of the negotiated options.

SUCCESS: The IUT correctly responds to the negotiation sequences. The IUT correctly enables the Status option.

FAILURE: The IUT does not correctly respond to the
negotiation sequences and/or the IUT does not
correctly enable the Status option.

Test 18: **Close the Telnet Connection (Not explicit in**
MIL-STD-1782)

- Does the IUT server TELNET respond correctly when the
user TELNET closes the connection.

ACTION: The REF sends a command to close the
connection.

VERIFICATION: Check to see if the REF reports the
connection closed.

SUCCESS: The IUT correctly responds to a close of the
Telnet connection.

FAILURE: The IUT does not correctly respond to a close.

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Scenario SERVER OPTIONS1

Scenario **SERVER_OPTIONS1** tests commonly implemented optional
TELNET commands: Are You There; Erase Character; Erase Line;
GoAhead; and Interrupt Process.

Test 8: **Are You There (AYT) Command**

- Can the server TELNET correctly respond to an AYT?

ACTION: REF sends an AYT command.

VERIFICATION: Check that REF reports that it has
received a visible response from the IUT.

SUCCESS: Receipt of AYT command causes IUT to respond
with a visible response.

FAILURE: No visible response returned by IUT after
receiving an AYT command.

Test 9: **Erase Character (EC) Command**

- Can the server TELNET correctly respond to an EC?

ACTION: REF sends an EC command embedded in a data
string.

VERIFICATION: Check that IUT sends to the Central
Driver the data string with the character
immediately preceding the EC deleted.

SUCCESS: IUT correctly handles EC command by deleting
immediately preceding character.

FAILURE: IUT does not correctly handle EC command -
the character immediately preceding the EC is not
deleted.

Test 10: **Erase Line (EL) Command**

- Can the user TELNET correctly respond to an EL?

ACTION: REF sends an EL command embedded in a string
containing three lines.

VERIFICATION: Check that IUT returns to the Central
Driver the received data string with the line
immediately preceding the EL command deleted.

SUCCESS: IUT correctly handles EL by deleting
immediately preceding line.

FAILURE: IUT does not correctly handled EL -- the
correct line was not deleted.

Test 17: **Interrupt Process (IP) Command**

- Can the server TELNET correctly respond to an IP?

ACTION: REF sends an IP command.

VERIFICATION: Check that REF reports that it has
received the IUT cursor indicating that the
process being run has been interrupted. (The
process being run on the IUT was the server
Remote Driver.)

SUCCESS: IUT correctly responds to IP by interrupting
its running process.

FAILURE: IUT does not correctly respond to IP command.

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Scenario SERVER OPTIONS2

Scenario **SERVER_OPTIONS2** tests optional TELNET command Abort Output.

Test 11:   **Abort Output (AO) Command**

- Does the server TELNET respond correctly to AO?

ACTION: REF sends an AO command.

VERIFICATION: Check that REF reports that it has received a Synch. The IUT is directed to send a data string and the REF checked to see if the data string is received. It should not be received.

SUCCESS: The IUT responds to an AO by sending the REF a Synch and not sending any further output data across the TELNET connection.

FAILURE: The IUT either does not respond to an AO with a Synch and/or continues to send output data to the peer protocol.

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Scenario SERVER SYNCH

Scenario **SERVER_SYNCH** Tests optional TELNET command: Synch.

Test 7:   **Synch command (TCP urgent with Data Mark (DM) embedded in the data stream)**

- Does the server TELNET correctly respond to a Synch?

ACTION: REF sends a series of Synch commands embedded in a very long data string.

VERIFICATION: Check the data string returned to the Central Driver by the IUT to determine if any data immediately preceding a Synch has been lost. The loss of this data indicates that the IUT has responded correctly to the Synch. However, if no

data is lost the IUT may also have handled the Synch correctly.

SUCCESS: All data immediately preceding a Synch should be lost. In some cases the IUT may handle the data before the Synch is transmitted. In this case no data should be lost.

FAILURE: If data transmitted after the last Synch was lost, the Synch is not being handled correctly by the IUT.